

Sub B<sup>2</sup> > 22. A communication method for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication method comprising:

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sampling a portion of said audio signal to generate a plurality of samples;  
digitizing said plurality of samples to generate a plurality of digitized samples;  
detecting an energy indicative of said first frequency tone in said portion;  
stalling said transmission of said digitized samples in response to said detecting;  
confirming said portion includes said DTMF signal; and  
generating a packet indicative of said DTMF signal, discarding said digitized samples and transmitting said packet, in response to said confirming.

23. The communication method of claim 22, wherein said first frequency is a high frequency and said second frequency is a low frequency.

24. The communication method of claim 22, wherein said detecting uses a wideband energy detector.

25. The communication method of claim 22, wherein said detecting compares said energy with a high threshold and a low threshold.

26. The communication method of claim 22, wherein said confirming confirms an existence of said first frequency and said second frequency in said portion.

27. The communication method of claim 22, wherein said confirming confirms a frequency tolerance of each said tone.

28. The communication method of claim 22, wherein said confirming confirms a frequency deviation of each said tone.

29. The communication method of claim 22, wherein said confirming confirms a twist in said portion.

30. A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

a sampler capable of sampling a portion of said audio signal to generate a plurality of samples;

a digitizer capable of digitizing said plurality of samples to generate a plurality of digitized samples;

a detector capable of detecting an energy indicative of said first frequency tone in said portion; and

a processor capable of stalling said transmission of said digitized samples in response to said detector and confirming said portion includes said DTMF signal;

wherein said processor is further capable of generating a packet indicative of said DTMF signal, discarding said digitized samples and transmitting said packet, in response to said confirming.

31. The communication device of claim 30, wherein said first frequency is a high frequency and said second frequency is a low frequency.

32. The communication device of claim 30, wherein said detector is a wideband energy detector.

33. The communication device of claim 30, wherein said detector compares said energy with a high threshold and a low threshold.

34. The communication device of claim 30, wherein said processor confirms an existence of said first frequency and said second frequency in said portion.

35. The communication device of claim 30, wherein said processor confirms a frequency tolerance of each said tone.

36. The communication device of claim 30, wherein said processor confirms a frequency deviation of each said tone.

37. The communication device of claim 30, wherein said processor confirms a twist in said portion.

38. A communication method for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication method comprising:

analyzing a portion of said audio signal to detect an element indicative of said DTMF;

stalling said transmission of said portion if said analyzing detects said element, else continuing said transmission of said portion;

processing said portion, in response to said stalling, to confirm said portion includes said DTMF signal; and

discarding said portion, generating a packet indicative of said DTMF signal and transmitting said packet if said processing confirms said portion includes said DTMF signal, else continuing said transmission of said portion.

39. The communication method of claim 38, wherein said element is an energy of said first frequency.

40. The communication method of claim 39, wherein said first frequency is a high frequency and said second frequency is a low frequency.

41. The communication method of claim 39, wherein said analyzing uses a wideband energy detector.

42. The communication method of claim 41, wherein said analyzing compares said energy with a high threshold and a low threshold.

43. The communication method of claim 38, wherein said processing is capable of confirming an existence of said first frequency and said second frequency in said portion.

44. The communication method of claim 38, wherein said processing is capable of confirming a frequency tolerance of each said tone.

45. The communication method of claim 38, wherein said processing is capable of confirming a frequency deviation of each said tone.

46. The communication method of claim 38, wherein said processing is capable of confirming a twist in said portion.

47. A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

a processor capable of analyzing a portion of said audio signal to detect an element indicative of said DTMF, wherein said processor stalls said transmission of said portion if said processor detects said element, else said processor continues said transmission of said portion;

wherein said processor processes said portion, in response to said stalling, to confirm said portion includes said DTMF signal, and wherein said processor discards said portion, generates a packet indicative of said DTMF signal and transmits said packet if said processor confirms said portion includes said DTMF signal, else said processor continues said transmission of said portion.

48. The communication device of claim 47, wherein said element is an energy of said first frequency.

49. The communication device of claim 48, wherein said first frequency is a high frequency and said second frequency is a low frequency.

50. The communication device of claim 48, wherein said processor uses a wideband energy detector for analyzing said portion.

51. The communication device of claim 50, wherein said processor compares said energy with a high threshold and a low threshold for analyzing said portion.

52. The communication device of claim 47, wherein said processor is capable of confirming an existence of said first frequency and said second frequency in said portion.

53. The communication device of claim 47, wherein said processor is capable of confirming a frequency tolerance of each said tone.

54. The communication device of claim 47, wherein said processor is capable of confirming a frequency deviation of each said tone.

55. The communication device of claim 47, wherein said processor is capable of confirming a twist in said portion.

56. A communication method for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication method comprising:

detecting an element indicative of said DTMF;

stalling said transmission of said portion, in response to said detecting;

confirming said portion includes said DTMF signal; and

a1 discarding said portion, generating a packet indicative of said DTMF signal and transmitting said packet, in response to said confirming;

57. The communication method of claim 56, wherein said element is an energy of said first frequency.

58. The communication method of claim 57, wherein said detecting uses a wideband energy detector.

59. The communication method of claim 58, wherein said detecting compares said energy with a high threshold and a low threshold.

60. The communication method of claim 56, wherein said first frequency is a high frequency and said second frequency is a low frequency.

61. The communication method of claim 56, wherein said confirming confirms an existence of said first frequency and said second frequency in said portion.

62. The communication method of claim 56, wherein said confirming confirms a frequency tolerance of each said tone.

63. The communication method of claim 56, wherein said confirming confirms a frequency deviation of each said tone.

64. The communication method of claim 56, wherein said confirming confirms a twist in said portion.

65. A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

means for detecting an element indicative of said DTMF;

means for stalling said transmission of said portion for use in response to said means for detecting;

means for confirming said portion includes said DTMF signal; and

means for discarding said portion, means for generating a packet indicative of said DTMF signal and means for transmitting said packet for use if said means for confirming confirms said portion includes said DTMF signal.

66. The communication device of claim 65, wherein said element is an energy of said first frequency.

67. The communication device of claim 66, wherein said means for detecting uses a wideband energy detector.

68. The communication device of claim 67, wherein said means for detecting compares said energy with a high threshold and a low threshold.

69. The communication device of claim 65, wherein said means for confirming confirms an existence of said first frequency and said second frequency in said portion.

70. A computer software product for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said computer software product comprising:

code for detecting an element indicative of said DTMF;

code for stalling said transmission of said portion for execution in response to said code for detecting;

code for confirming said portion includes said DTMF signal; and

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code for discarding said portion, code for generating a packet indicative of said DTMF signal and code for transmitting said packet for execution in response to said code for confirming.

71. The computer software product of claim 70, wherein said element is an energy of said first frequency.

72. The computer software product of claim 71, wherein said first frequency is a high frequency and said second frequency is a low frequency.

73. The computer software product of claim 71, wherein said code for detecting uses a wideband energy detector.

74. The computer software product of claim 73, wherein said code for detecting compares said energy with a high threshold and a low threshold.

75. The computer software product of claim 70, wherein said code for confirming confirms an existence of said first frequency and said second frequency in said portion.

76. A communication device for a transmission of an audio signal, said audio signal including a dual-tone multi-frequency (DTMF) signal having a first frequency tone and a second frequency tone, said communication device comprising:

a detector capable of detecting an element indicative of said DTMF; and

a processor capable of stalling said transmission of said portion, in response to said detector detecting said element indicative of said DTMF, confirming said portion includes said DTMF signal, discarding said portion, generating a packet indicative of said DTMF signal and transmitting said packet.

77. The communication device of claim 76, wherein said element is an energy of said first frequency.



78. The communication device of claim 77, wherein said first frequency is a high frequency and said second frequency is a low frequency.
79. The communication device of claim 77, wherein said detector uses a wideband energy detector.
80. The communication device of claim 79, wherein said detector compares said energy with a high threshold and a low threshold.
81. The communication device of claim 76, wherein said processor confirms an existence of said first frequency and said second frequency in said portion.
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